

AMBIENT AIR QUALITY IMPACT REPORT (NSR 4-4-4, SAC 03-01)

This document serves as the statement of basis as required by 40 CFR Part 124. This document sets forth the legal and factual basis for permit conditions, with references to applicable statutory or regulatory provisions, including provisions under 40 CFR § 52.21. This document is for all parties interested in the permit.

I. APPLICANT

Knauf Insulation GmbH
240 Elizabeth Street
Shelbyville, Indiana 46176

II. FACILITY LOCATION

Knauf Insulation GmbH
3100 District Drive
Shasta Lake, California 96019

III. FACILITY DESCRIPTION

Knauf Insulation GmbH operates a fiberglass manufacturing facility in Shasta County, California. The Standard Industrial Classification (SIC) code for the facility is 3296. The facility consists of the following operations: (1) raw materials handling; (2) molten glass production; (3) glass fiber forming; (4) curing operation; (5) cooling operation; and (6) facing, cutting and packaging. A description of each of these operations follows.

Raw Materials Handling

The raw materials used to manufacture fiberized glass are silica sand, which is the primary component, and granular quantities of soda ash, limestone, borax, dolomite, feldspar and other minor ingredients. The raw materials are received in bulk by rail car and truck. The bulk raw materials are unloaded from the trucks and rail cars by a mechanical conveying system to storage silos. All conveying and storage areas are enclosed.

From the storage areas, the materials are weighed and blended according to the desired product recipe before being charged into the electric glass melting furnace. The weighing, blending and charging operations are conducted in batch mode.

Particulate matter is the only pollutant generated by the raw materials handling operation. Particulate matter emissions from this operation are captured in indoor dust collectors and are vented indoors. There is no ultimate vent point that leads to the atmosphere outside of the building. Air is exhausted from the dust collectors only when batch raw materials or mixed batch is transported through the system. Particulate matter emissions captured in the dust collectors are recycled back to the system.

The furnace day bins, containing mixed batch ready to be put into the furnace, are located next to the furnace. Particulate emissions from the day bins are exhausted into the furnace/forming building. Negative pressure inside of this building prevents any emissions from these devices from exiting the building. Due to the large volume of air exhausted through the forming section, a negative pressure is generated throughout the entire building. All particulate matter emissions from the dust collectors, raw material storage tanks, washwater storage, and the other raw materials handling operations pass through the forming section control devices and are discharged through the Main Stack. Also, particulate matter emissions from the mixing process and indoor venting are routed through the forming operation via induced draft to the forming section control devices and are discharged through the Main Stack. Any emissions from these sources are measured during emission tests on the Main Stack.

Molten Glass Production

After introduction into the electric glass melting furnace, the raw materials are heated to a temperature of approximately 2,500°F and transformed through a series of chemical reactions to molten glass. The proportions of the glass ingredients remain the same for the various products manufactured. The raw materials are introduced continuously at the rear of the furnace where they are slowly mixed and dissolved. Since all glass melting is done electrically, no oxides of nitrogen (NO_x) or other combustion-related emissions are created. In addition, because the facility uses a “cold top” process, temperatures at the portion of the furnace in contact with ambient air are maintained at approximately 200°F, well below the temperatures at which thermal NO_x formation might be of concern. As a result, the only pollutant emitted by the glass melting furnace is particulate matter (including particulate matter less than 10 microns in diameter or “PM₁₀”). These furnace emissions are routed through two fabric filter baghouse dust collectors at the Furnace Stack to reduce the particulate matter emissions.

Glass Fiber Forming

A rotary spin process is used to form glass fibers. In the rotary spin process, molten glass from the furnace is continuously poured into a rotating cylinder or spinner. Centrifugal force causes the molten glass to flow through small holes in the wall of the spinner. The emerging glass fibers are entrained in a high velocity air stream, and binder is applied to bond the fibers. The fiberglass from several of the rotary spinners is also diverted without binder application to a processing area to be packaged as unbonded blowing wool insulation.

The binder that is applied to bond the fibers typically consists of a solution of phenol-formaldehyde resin, water, urea, organo silane, ammonium sulfate and ammonia. The glass fibers are pulled onto a perforated flyte conveyer belt directly below the spinners and are collected onto the conveyer to form a fiberglass mat. Each spinner contributes fiberized glass to the mat causing the mat to increase in thickness as it travels through the forming section. The thickness of the uncured fiberglass mat is controlled by the conveyer speed.

The quantity of binder solids sprayed onto the glass fibers is governed by the type of product being manufactured. Residential insulation is approximately 4% binder by weight, and metal building, duct wrap, and flexible duct material are up to 10% binder by weight. Typically, about 85% of the binder applied to the fiberglass remains on the product, and the remainder is exhausted with the forming and curing oven exhaust to an air pollution control device or remains on the conveyer.

The pollutants emitted from the forming and binder application process are reactive organic gases (also known as volatile organic compounds or “VOCs”) and PM10. The exhaust stream from the forming section is sent through venturi scrubbers and a wet electrostatic precipitator prior to entering the Main Stack.

Curing Operation

After the mat is formed, it continues on the conveyer to the curing oven. Upper and lower perforated flytes in the oven compress and cure the fiberglass mat to the desired final thickness. The curing oven drives off moisture remaining on the fibers and cures the binder. The oven has six zones and two vestibule burners to maintain temperature. Each zone has its own low-NO_x burner and blower to recirculate hot air through the fiberglass mat. The vestibule burners are also low-NO_x burners and are used to control the temperature of the oven exhaust gas as it is routed to two (2) thermal oxidizers. Each of the eight oven burners is rated at 3.7 million Btu per hour.

The oven temperature ranges from 450°F to 500°F. Hoods are at the entry and exit of the oven to capture the exhaust from the oven. Each hood directs exhaust gases to a thermal oxidizer for destruction of VOCs and control of condensable particulates. From the thermal oxidizers the exhaust gases are routed through the Main Stack. The pollutants emitted from the curing oven are particulate matter and VOCs from heating the binder, and NO_x, sulfur dioxide (SO₂), and carbon monoxide (CO) from the natural gas combustion burners. NO_x is also emitted as a result of the thermal oxidation of urea and ammonia from the binder. Ammonia is one of the byproducts that are driven off during the thermal decomposition of urea. As the ammonia passes through the thermal oxidizers operating with a minimum temperature of 1400°F, some of the ammonia is converted to additional NO_x. Most of the NO_x emitted from the Main Stack is associated with the thermal decomposition of ammonia.

Cooling Operation

After the mat has been cured, it passes over a cooling section where ambient temperature air is induced through the mat. The regulated pollutants emitted from the cooling section are particulate matter and VOCs. The exhaust from the cooling is routed to a wet scrubber before exiting through the Main Stack.

Facing, Cutting and Packaging

An asphalt adhesive precoated paper facing is heated and pressed against the cooled mat for some of the insulation products. A water-based adhesive is also used to glue facings to some products.

Just prior to the facing section, the fiberglass mat edges are trimmed and cut. The trimmed edge waste is recycled, using an air conveyer system, back to the forming section to be included with the mat being formed. Blowing wool is sent through a separation system that removes the wool from the blown air stream and packages it.

The only emissions from these processes are particulate matter which are controlled through dust collectors. The remaining emissions are exhausted within the building that houses these processes and does not vent to the outside air.

IV. PROJECT DESCRIPTION: REQUEST FOR PERMIT REVISION

New and modified major stationary sources must obtain a Prevention of Significant Deterioration (PSD) permit that includes controls on all pollutants the source has the potential to emit (PTE) in major and significant amounts. 40 CFR § 52.21. On March 22, 2000, the Shasta County Department of Resource Management, Air Quality Management District (“District”) issued a PSD permit to Knauf under a delegated PSD program, authorizing the construction of the fiberglass manufacturing plant. In the facility’s PSD application to the District, Knauf claimed it would only be a major source of PM10 for PSD purposes. For CO, NOx, and VOCs, Knauf determined that potential emissions would be below the PSD significance thresholds and the source would therefore be “minor” for these pollutants. The District issued Knauf a PSD permit in 2000 containing PSD BACT requirements for PM10 and State Implementation Plan (SIP) requirements for the other emissions. The BACT limits for PM10 were 28.4 lb/hr and 3.5 lb/ton of glass pulled (124.4 tpy) for the Main Stack and 0.1 lb/hr (0.4 tpy) for the Furnace Stack. The SIP requirements included a federally-enforceable minor source limit for NOx of 5.66 lb/hr (24.8 tpy), which applied to the forming, curing, and cooling processes (collectively referred to as the “manufacturing line”). The PSD permit issued in 2000 also limited the facility’s production to 195 tons of glass produced per day.¹

¹ EPA’s use of the term “tons of glass produced” is equivalent to the term “tons glass pulled”. (See also the ‘Daily Production Limit’ discussion in this section and the BACT analyses in Section VII of this permit.)

PM10 and NOx Emission Limits

The facility began operation on February 4, 2002. In 2002 and 2003, Knauf performed emissions tests which showed that although facility-wide PM10 emissions were lower than expected (i.e., lower than 124.8 tpy), the very small portion of PM10 emissions from the Furnace Stack (0.4 tpy) exceeded the Furnace Stack BACT limit of 0.1 lb/hr. The testing also showed Knauf's NOx emissions exceeded the minor source limit of 24.8 tpy.

The NOx emissions in some test results were as high as 14.59 lb/hr, well over the emission limit of 5.66 lb/hr Knauf requested in its PSD permit application. These NOx emissions not only exceeded the permit limit but also meant the facility had a NOx PTE above the PSD significance threshold of 40 tpy for NOx.

As a result of these emissions test findings, Knauf applied to the District to have the NOx emission limit increased and to shift some of the Main Stack PM10 emissions to the Furnace Stack PM10 emissions. On March 3, 2003, EPA withdrew the PSD delegation from several permitting authorities in Region IX, including Shasta County, making EPA the PSD permitting authority for Shasta County (see 68 FR 19371). Knauf met with EPA to discuss permitting issues in March and April 2003, and submitted a PSD permit application in May 2003. Based on EPA comments, Knauf amended its PSD application in August 2003. EPA determined the application was complete on August 15, 2003.

The amended PSD application requested two changes. First, for NOx, Knauf requested that EPA increase the limit from 5.66 lb/hr to 22.6 lb/hr. Second, Knauf requested that EPA modify the PM10 BACT limits for both the furnace (Furnace Stack) and manufacturing line (Main Stack). Knauf requested that EPA increase the PM10 BACT emissions limit for the electric glass melting furnace (Furnace Stack) from 0.1 lb/hr to 1.0 lb/hr. Knauf also requested a reduction in the limit for the Main Stack from 28.4 lb/hr to 21.8 lb/hr to compensate for the increase at the Furnace Stack. The reduction requested at the Main Stack would reduce the total PM10 emitted from the combined Main and Furnace Stacks from 124.8 tpy to 100 tpy.

Daily Production Limit

On December 9, 2005, Knauf further supplemented its PSD application by submitting information to support its request to increase its daily production limit from 195 tons per day to 225 tons per day.

By way of background, Knauf has also submitted a letter to EPA dated December 6, 2005, asserting that the daily production limit of 195 tons per day is a "state-imposed Authority to Construct permit term" rather than a "federal 'PSD' permit term." Based on this assertion, Knauf argues that EPA's PSD permit should not contain any production limit and that only a significant emissions increase would require federal PSD review. However, Knauf overlooks the fact that Knauf's original PSD permit application relied on the production rate (195 tons per day) to establish the PM10 BACT rate of 3.51 lb/ton

of glass pulled. This emissions rate is essential to the PSD BACT determination, as is the PM10 lb/hour emissions rate. If Knauf increases its production rate, then its BACT rate will change accordingly. EPA cannot change a previously established BACT emissions rate without re-evaluating if the new limit remains adequate for BACT. Consequently, it is appropriate for EPA to analyze the consequences of allowing Knauf to change its production rate in the PSD permit.

While Knauf has asserted that EPA should not consider the production rate as a federal PSD condition, it is notable that several petitioners in 1999 challenged whether the daily production limit was sufficiently protective. The petitioners argued that Knauf would attempt to increase production by adding new manufacturing lines after the PSD permit was issued. EPA's Environmental Appeals Board (EAB) rejected the petitions seeking review of the PSD permit on this basis because the EAB understood that the PSD permit review process, such as the analysis being undertaken now, would be necessary for changing PSD permit conditions such as the BACT rate. See *In Re: Knauf Fiber Glass, GmbH*, 8 E.A.D. 121, 160-161. Despite Knauf's assertions to the contrary, the EAB clearly included its review of the production rate in the federal PSD issues by distinguishing a number of other issues raised in petitions as "non-PSD issues." See *In Re: Knauf Fiber Glass, GmbH*, 8 E.A.D. 121, 161 (EAB 1999).

Knauf's December 9, 2005, supplemental information explains that although its glass melting furnace has a nominal daily production limit based on its design capacity, the furnace can be operated at a higher capacity but with a shorter life expectancy. In other words, Knauf's furnace was designed to produce 195 tons per day. The furnace can produce 225 tons per day but Knauf will be required to re-brick the furnace at an earlier date than would occur if the furnace was only operated at 195 tons per day.

Knauf's supplemental information submitted on December 9, 2005, also shows that Knauf can operate the furnace at the higher production rate of 225 tons per day without exceeding the short-term daily NO_x and PM₁₀ emissions limits of 16.5 lb/hr and 28.5 lb/hr, respectively, for the entire facility.

As a result of raising its daily production rate, Knauf will be meeting a more stringent BACT emission limit for both NO_x and PM₁₀. At 225 tons per day of glass pulled, Knauf will meet a NO_x BACT rate of 1.76 lb/ton of glass pulled instead of a rate of 2.04 lb/ton of glass pulled at a rate of 195 tons per day. Similarly, for PM₁₀, Knauf will reduce its BACT rate from 3.51 to 3.10 lbs/ton of glass pulled for the combined Furnace Stack and Main Stack.

The respective emissions rate for NO_x and PM₁₀ proposed by Knauf at its higher rate of production (225 tons per day) is within or lower than the BACT rates achieved by other similar facilities. These BACT rates are discussed in more detail in Section VII. For this reason, we are proposing to increase Knauf's permitted production rate from 195 tons per day to 225 tons per day. Knauf's actual emissions of NO_x and PM₁₀ will not increase

and Knauf's emissions rate based on the amount of glass produced will remain as low or lower than the rate other fiberglass facilities are meeting.

The current, requested and proposed emission limits are provided in Tables 1 and 2. The basis for the proposed limits is explained in Section VII of this document.

Table 1: Current, Requested and Proposed NO_x Limits

Emission Unit/Line	Current NO _x limits in current PSD permit			Requested NO _x BACT limits			Proposed NO _x BACT limits		
	lb/ton	lb/hr	tpy	lb/ton	lb/hr	tpy	lb/ton	lb/hr	tpy
Main Stack (manufacturing line)	0.7	5.66	24.8	2.78	22.6	99.0	1.76	16.5	72.3
Furnace Stack	--	--	--	--	--	--	--	--	--
Total	0.7	5.66	24.8	2.78	22.6	99.0	1.76	16.5	72.3

Table 2: Current, Requested and Proposed PM₁₀ Limits

Emission Unit/Line	Current PM ₁₀ limits in current PSD permit			Requested PM ₁₀ BACT limits			Proposed PM ₁₀ BACT limits		
	lb/ton	lb/hr	tpy	lb/ton	lb/hr	tpy	lb/ton	lb/hr	tpy
Main Stack (manufacturing line)	3.50	28.4	124.4	2.69	21.8	95.6	3.03	28.4	124.4
Furnace Stack	0.01	0.1	0.4	0.12	1.0	4.4	0.07	0.67	2.2
Total	3.51	28.5	124.8	2.81	22.8	100.0	3.10	29.07	126.6

Table 3 shows the PTE for other pollutants emitted by the facility. These pollutants are either minor for purposes of PSD because the potential emissions of the pollutants from Knauf are limited in a District-issued permit (see Table 4) or are not regulated under the PSD program.

Table 3: Estimated Emissions for Other Pollutants (no changes requested)

Pollutant	lb/hr	Tpy
SO ₂	1.0	4.4
CO	22.3	97.7
VOC (includes formaldehyde and phenol)	9.0	39.4
Formaldehyde	2.0	8.8
Phenol	6.0	26.3
Ammonia	38.0	166.4

Since submitting its PSD application, Knauf has received revised permits from the District with the following limits listed in Table 4 for the Main Stack:

Table 4: Main Stack limits from District-issued permit

Pollutant	lb/hr (3 hr. avg)	Tpy
PM10	18.0	78.84
NOx	16.5	72.27
CO	22.3	97.67
SO ₂	1.0	4.38
NMHC	9.0	39.42

In addition, the District increased the Furnace Stack PM10 limit from 0.1 lb/hr to 1.0 lb/hr. See District Permits to Operate, #02-PO-10, #02-PO-09, #97-PO-26, #97-PO-27, #97-PO-28, and #97-PO-29 (Feb. 7, 2005).

V. APPLICABILITY OF THE PSD REGULATIONS

As described above, Knauf's PSD application requests four permit revisions:

1. A modified limit for PM10 emissions from the Furnace Stack.
2. A higher limit for NOx emissions from the Main Stack.
3. A lower limit for PM10 from the Main Stack.
4. An increase in the daily production limit.

This section outlines the applicability of the PSD regulations to each of these requests.

Changing the PM10 Limit for the Furnace

Because Knauf projected that the fiberglass plant would be a major source for PM10, all emissions of PM10 were subject to the PSD BACT requirement. The limits for both the Furnace Stack and Main Stack therefore represent the emissions believed to be achievable with the application of best available controls. In general, to increase a BACT limit requires the applicant to demonstrate that the previous BACT determination was erroneous and that the proposed new limit should be considered BACT.

As explained further below, we do not consider the previous BACT limit determination to be erroneous and we do not consider Knauf's request to change the Furnace Stack limit to be a relaxation of BACT. The previous BACT determination made by the District only included an engineering estimate for filterable particulates and did not account for condensable particulates that could form in the Furnace Stack because Knauf neglected to

identify condensable PM10 for consideration in the previous BACT determination. The test method used to measure emissions from the stack measures filterable and condensable particulates. The limit will be changed to build upon the original determination of BACT for filterable particulate emissions, which is the only portion controlled by the BACT controls. The revision to the limit also makes the limit consistent with the method used to measure emissions but assumes the same level of control for the filterable portion of the particulate emissions from the source. Thus, we do not believe a new BACT analysis is required. We nonetheless review the BACT criteria to confirm the appropriateness of the limit as revised.

Relaxing the NOx Limit

Knauf's emissions tests demonstrated that the original permit limits for NOx were not appropriate. These limits had been used by Knauf to demonstrate that potential NOx emissions would be below the significance thresholds for PSD. As a result, NOx emissions at the source were not subject to review, including a review of emission controls, under the federal PSD regulations. Knauf's new proposed NOx limits translate into annual potential emissions in excess of the 40 tpy PSD significance threshold. Under 40 CFR § 52.21(r)(4), relaxations in enforceable emission limits that result in a source being treated as major source trigger the PSD requirements as if the construction of the source had not yet commenced. See also Memorandum from Terrell E. Hunt, Assoc. Enf. Counsel, Air Enf. Div., OECA, and John S. Seitz, Dir., Stationary Source Div., OAQPS (June 13, 1989). In other words, a source cannot avoid pre-construction PSD review by taking a limit on emissions to keep the source minor and then, post-construction, seek to relax the limit to allow emissions that would otherwise have triggered review. Thus, for purposes of this permit revision application, EPA considers Knauf a major source for NOx and will review the proposed NOx emissions limit in accordance with our PSD requirements as if the source had not yet been constructed. Therefore, Knauf is subject to the following PSD review requirements for NOx at the Main Stack from the manufacturing line:

1. Application of BACT for each regulated pollutant that would be emitted in significant amounts;
2. Analysis of ambient air quality impacts;
3. Analysis of impacts on Class I areas;
4. Analysis of impacts on soils, vegetation, and visibility; and
5. Public notification of the proposed project.

Lowering the PM10 Limit for the Main Stack

Knauf's PSD application requested lower Main Stack PM10 emission limits primarily to compensate for increasing the PM10 emission limits requested for the Furnace Stack. Such post-construction analysis, however, cannot undo the conclusion in Knauf's original application that the project proposed and permitted in 2000 was a major source for PM10 under our PSD regulations required to meet BACT for all PM10 emissions. Moreover, emissions reductions at one emission unit cannot be used to satisfy BACT at another. Thus, PM10 emissions from the Furnace Stack remain subject to the BACT requirement, notwithstanding the requested PM10 emission reductions at the Main Stack. Because the proposed lowering of the Main Stack emission limit is not required under PSD and does not achieve the purpose sought by Knauf, we propose not to act on the request to tighten the Main Stack PM10 limit in the PSD permit. We note that the District permits issued in February 2005 include a new PM10 limit for the Main Stack of 18.0 lb/hr, which is lower than the limit requested in Knauf's amended PSD permit and lower than the limit of 28.4 lb/hr that will remain in the federal PSD permit.

Increasing the Production Capacity

As explained previously in this document, on December 9, 2005, Knauf requested EPA to increase its daily production limit from 195 tons per day to 225 tons per day. Although the increase will not cause an increase in potential emissions, the consequences of increasing production are included in our PSD review because the production rate is considered in the BACT determination.

VI. PM10 AS A SURROGATE FOR PM2.5

The revised NAAQS for particulate matter, which include the revised NAAQS for PM10 and new NAAQS for PM2.5, became effective on September 16, 1997. On October, 23, 1997, EPA issued a memorandum addressing the interim use of PM10 as a surrogate for PM2.5 in meeting PSD provisions for PM2.5 as required by title 1, Part C of the Clean Air Act ("Act"). See also Memorandum from John S. Seitz, Director Office of Air Quality Planning and Standards, to Regional Air Directors, *Interim Implementation of New Source Review for PM2.5* (Oct. 23, 1997). This memorandum referenced provisions of Part C of the Act which EPA interprets to require PSD permits for PM2.5 upon the effective date of the PM2.5 NAAQS, and identified significant technical difficulties with implementing PSD for PM2.5 because of limitations in ambient monitoring and modeling capabilities. Because the agency has not promulgated the final PM2.5 implementation rule, administration of a PM2.5 PSD program remains impractical. Accordingly, the agency will continue to follow the October 23, 1997, guidance for PSD requirements.

VII. BEST AVAILABLE CONTROL TECHNOLOGY REVIEW

The PSD regulations require that a determination of BACT be made for each pollutant subject to review. BACT is defined as “an emission limitation (including a visible emission standard) based on the maximum degree of reduction of each pollutant subject to regulation under the Act ... which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts, and other costs, determines is achievable for such source.” BACT must be at least as stringent as any applicable New Source Performance Standards (NSPS) under 40 CFR Part 60 or National Emission Standard for Hazardous Air Pollutants (NESHAP) under 40 CFR Part 61. EPA outlines the process it will use to do this case-by-case analysis (referred to as “top-down” BACT analysis) in its Draft New Source Review Workshop Manual (Oct. 1990). The top-down BACT analysis is a well established procedure that has been accepted by the courts as appropriate. The analysis consists of five steps:

1. Step 1 - Identify all potentially available control technologies for each pollutant: The list of potentially available control technologies for BACT is based on defining the proposed source broadly. Technologies that have been required as Lowest Achievable Emission Rate (“LAER”) options as well as technologies or processes used outside the United States must be included as available.²
2. Step 2 - Eliminate technically infeasible options: Because the source category for identifying potentially available control technologies in Step 1 is broad, certain technologies may be determined infeasible under Step 2 when the particular physical, engineering and chemical processes of the proposed source are considered in more detail. The analysis in Step 2 may review whether a technology has been “demonstrated”, which is generally established if the technology has been installed and operated successfully elsewhere. If the technology has not been demonstrated, it may still be technically feasible if the technology is both “available” and “applicable.”
3. Step 3 - Rank remaining control technologies by control effectiveness, with the most effective listed at the top.
4. Step 4 - Evaluate most effective controls by including in the analysis:
 - i. Economic impacts of each option based on total cost effectiveness and, where appropriate, incremental cost effectiveness;
 - ii. Energy impacts of each option; and

² Control technology descriptions used in the following BACT analyses, except for batch water sprays, are from the EPA Air Pollution Control Cost Manual - Sixth Edition (EPA 452/B-02-001), January 2002.

- iii. Other environmental impacts of each option.
- 5. Step 5 - Select BACT by choosing the most effective control technology that is not eliminated under Step 4.

BACT for PM10 - ELECTRIC FURNACE

Before turning to an analysis of whether Knauf's proposed particulate matter limit at the Furnace Stack represents BACT, we first consider Knauf's claims that the current limit was based on an erroneous BACT determination. BACT for the Furnace Stack was previously determined by the District to be 0.10 lb/hr and 0.44 tpy of total particulate matter.³ Knauf's PSD application for its PSD permit issued in 2000 stated that the company would install baghouses to ensure that particulate emissions from the electric glass melting furnace would be less than 0.1 lb/hr. However, particulate matter from the Furnace Stack consists of filterable and condensable particulates. Filterable particulates are particles that can be captured through the baghouse collection system. Condensable particulate is that portion of particulate matter emissions that are gaseous at stack conditions, but which quickly condense to a solid form when released to the atmosphere. Baghouses, however, do not remove condensable emissions. As Knauf explains, the original limit was based on the removal percentage achieved by baghouses, which were found to be the technology representing BACT. Thus, the 0.1 lb/hr limit only represents the filterable particulate matter emission rate.

EPA Method 5E, which is the source test method required by the current PSD permit, measures both filterable and condensable total particulate matter. (Although the test method measures total particulate matter, and not specifically PM10, Method 5E is used as a surrogate measure for controlling PM10.) Using EPA Method 5E, Knauf's actual emissions exceeded the 0.1 lb/hr limit and have been as high as 0.2 lb/hr. Based on testing, Knauf determined that measured emissions from the Furnace Stack included condensable particulates, which had not been considered in setting the emissions limit for particulate matter. Knauf estimated that condensable particulates could make up 80 to 90% of the particulates exiting the Furnace Stack. As a result, Knauf seeks to revise the emission limit for particulate matter to include the condensable particulate matter emissions.

Knauf's request does not call into question the original BACT determination for filterable particulates. The determination of the emissions reductions that can be achieved by BACT was not erroneous. The error in setting the limit was the failure to account for the uncontrolled portion of the emissions stream measured by the test method. A new BACT analysis is not required. We nonetheless have reviewed the controls and permit limits at

³ Although the District's BACT determination did not include a limit specifically for PM10, EPA's BACT determination will apply to PM10 and not total particulate matter.

similar sources to confirm the revised limits are consistent with BACT limits at other sources.

Step 1: Identify potentially available control technologies

The RACT/BACT/LAER (RBLC) Clearinghouse and review of other New Source Review (NSR) permits reveal that similar fiberglass sources use fabric filtration baghouses, electrostatic precipitators (ESPs), wet scrubbers, and batch water spray systems for controlling particulate matter emissions from glass melting furnaces. Cyclones can also be used for particulate control at glass melting furnaces. These control alternatives are further described as follows.

Fabric Filtration

A fabric filter unit consists of one or more isolated compartments containing rows of fabric bags in the form of round, flat, or shaped tubes, or pleated cartridges. Particle-laden gas passes up (usually) along the surface of the bags then radially through the fabric. Particles are retained on the upstream face of the bags, and the cleaned gas stream is vented to the atmosphere. The filter is operated cyclically, alternating between relatively long periods of filtering and short periods of cleaning. During cleaning, dust that has accumulated on the bags is removed from the fabric surface and deposited in a hopper for subsequent disposal.

Fabric filters collect particles with sizes ranging from submicron to several hundred microns in diameter at efficiencies generally in excess of 99 or 99.9%. The layer of dust, or dust cake, collected on the fabric is primarily responsible for such high efficiency. The cake is a barrier with tortuous pores that trap particles as they travel through the cake. Gas temperatures up to about 500°F, with surges to about 550°F, can be accommodated routinely in some configurations. Most of the energy used to operate the system appears as pressure drop across the bags and associated hardware and ducting. Typical values of system pressure drop range from about 5 to 20 inches of water.

Fabric filters are used where high efficiency particle collection is required. Limitations are imposed by gas characteristics (temperature and corrosivity) and particle characteristics (primarily stickiness) that affect the fabric or its operation and that cannot be economically accommodated. Important process variables include particle characteristics, gas characteristics, and fabric properties. The most important design parameter is the air- or gas-to-cloth ratio (the amount of gas in ft³/min that penetrates one ft² of fabric) and the usual operating parameter of interest is pressure drop across the filter system. The major operating feature of fabric filters that distinguishes them from other gas filters is the ability to renew the filtering surface periodically by cleaning. Common furnace filters, high efficiency particulate air (HEPA) filters, high efficiency air filters (HEAFs), and automotive induction air filters are examples of filters that must be discarded after a significant layer of dust accumulates on the surface. These filters are typically made of matted fibers, mounted in supporting frames, and used where dust

concentrations are relatively low. Fabric filters are usually made of woven or (more commonly) needle-punched felts sewn to the desired shape, mounted in a plenum with special hardware, and used across a wide range of dust concentrations.

Electrostatic Precipitators

An electrostatic precipitator (ESP) is a particle control device that uses electrical forces to move the particles out of the flowing gas stream and onto collector plates. The particles are given an electrical charge by forcing them to pass through a corona, a region in which gaseous ions flow. The electrical field that forces the charged particles to the walls comes from electrodes maintained at high voltage in the center of the flow lane. Once the particles are collected on the plates, they must be removed from the plates without re-entraining them into the gas stream. This is usually accomplished by knocking them loose from the plates, allowing the collected layer of particles to slide down into a hopper from which they are evacuated. Some precipitators remove the particles by intermittent or continuous washing with water. ESP control efficiencies can range from 95% to 99.9%.

Wet scrubbers

A wet scrubber is an air pollution control device that removes PM from waste gas streams primarily through the impaction, diffusion, interception and/or absorption of the pollutant onto droplets of liquid. The liquid containing the pollutant is then collected for disposal. There are numerous types of wet scrubbers that remove PM. Collection efficiencies for wet scrubbers vary with the particle size distribution of the waste gas stream. In general, collection efficiency decreases as the PM size decreases. Collection efficiencies also vary with scrubber type. Collection efficiencies range from greater than 99% for venturi scrubbers to 40-60% (or lower) for simple spray towers. Wet scrubbers are smaller and more compact than baghouses or ESPs. They have lower capital costs and comparable operation and maintenance (O&M) costs. Wet scrubbers are particularly useful in the removal of PM with the following characteristics: (1) sticky and/or hygroscopic materials (materials that readily absorb water); (2) combustible, corrosive and explosive materials; (3) particles which are difficult to remove in their dry form; (4) PM in the presence of soluble gases; and (5) PM in waste gas streams with high moisture content.

The primary disadvantage of wet scrubbers is that increased collection efficiency comes at the cost of increased pressure drop across the control system. Another disadvantage is that they are limited to lower waste gas flow rates and temperatures than ESPs or baghouses. Current wet scrubber designs accommodate air flow rates over 100,000 actual cubic feet per minute and temperatures of up to 750°F. Another disadvantage is that they generate waste in the form of a sludge which requires treatment and/or disposal. Lastly, downstream corrosion or plume visibility problems can result unless the added moisture is removed from the gas stream.

Batch Water Spray Systems

In this system, also called a batch wetting system, water is used to add moisture to the mixed batch ingredients charged into the glass melting furnace to minimize particulate matter emissions and the amount of fugitive emissions. The control efficiency is variable and is dependent on the moisture content of the batch materials.

Cyclones

Cyclones are simple mechanical devices commonly used to remove relatively large particles from gas streams. In industrial applications, cyclones are often used as pre-cleaners for the more sophisticated air pollution control equipment such as ESPs or baghouses. Cyclones are less efficient than wet scrubbers, baghouses, or ESPs.

Cyclones used as pre-cleaners are often designed to remove more than 80% of the particles that are greater than 20 microns in diameter. Smaller particles that escape the cyclone can then be collected by more efficient control equipment. This control technology may be more commonly used in industrial sites that generate a considerable amount of particulate matter, such as lumber companies, feed mills, cement plants, and smelters.

Step 2: Eliminate technically-infeasible options

Fabric filtration baghouses, dry ESPs, wet scrubbers, and batch water spray systems are all technically feasible since these technologies are used at similar facilities. Although cyclones were not found to be in use at similar facilities, this technology is technically feasible since it is “available” and “applicable.”

Step 3: Rank existing control technologies

Of the control alternatives for controlling particulate matter, baghouse fabric filtration is the most effective, achieving removal efficiencies in excess of 99%. Therefore, it is considered the top control alternative. ESPs, wet scrubbers, batch water spray systems, and cyclones all have lower control efficiencies, in that order, which would result in higher emissions than using a baghouse.

As part of step 3, we look at the emission limits achieved by similar sources using the feasible, available technologies. 40 CFR Part 60, Subpart CC, which is the applicable NSPS that applies to glass melting furnaces, sets a PM emission limit for glass melting furnaces at wool fiberglass plants of 0.50 lb of particulate matter per ton of glass pulled. Pursuant to the federal definition of BACT, the BACT determination must be at least as stringent as the NSPS PM standard of 0.50 lb per ton of glass produced. Although the standard applies to furnaces fired on gaseous or liquid fuel, and does not apply to all-electric melters such as the electric furnace at Knauf, the standard sets the threshold for the highest emissions limit that can be considered for this BACT analysis.

Table 5 shows the PM/PM10 BACT determinations from the RBLC and PSD permits for other similar facilities. For the purpose of comparing emissions performance between similar facilities, the key is the pound per ton of glass produced (lb/ton) emission limit which represents an average steady state emissions level per unit of product produced. Glass furnaces, including electric furnaces, at similar facilities have been permitted at PM/PM10 levels between 0.06 to 0.5 lb per ton of glass produced.

Steps 4 and 5: Evaluate the most effective controls and select BACT.

Knauf already uses the top, most effective control alternative of baghouse fabric filtration as BACT. This control technology has been used at similar sources to achieve emission levels as low as 0.061 lb per ton of glass pulled. Knauf estimates that 80 to 90% of the particulates exiting the Furnace Stack could be condensable particulate. Using the 85% figure for condensables and the original BACT limit of 0.1 lb/hr for the filterable portion of the particulate matter emissions, we calculate a total PM10 limit of 0.67 lb/hr, which equates to 0.07 lb per ton of glass pulled based on a production capacity of 225 tons of glass produced per day. This limit is lower than the limit requested by Knauf, which assumed 90% of the particulate emissions are condensable,⁴ but it is consistent with the limits achieved at similar sources and with emissions measured at Knauf. Therefore, we propose to revise the PM10 limit for the Furnace Stack to 0.67 lb/hr and 0.07 lb per ton of glass pulled.

⁴ Knauf requested to change the limit to 1.0 lb/hr. This equates to a limit of 0.11 lb per ton of glass pulled based on a maximum design capacity of 225 tons of glass produced per day, and full year-round operation at 8760 hours.

Table 5: PM/PM10 BACT Limits for Glass Furnaces at Fiberglass Facilities

Source	Location	Furnace type	Limit (lb/ton)	Limit (lb/hr)	PM Controls	Source of Information
Knauf Insulation	Lannett, AL	Gas furnace (Line 621)	0.19	1.50	ESP	RBLC AL-0044; PSD and Title V permits
		Gas furnace (Line 622)	0.27	2.44	ESP	PSD and Title V permits
Certainteed Corporation	Kansas City, KS	Gas furnace (Lines K-21 and K-22)	0.36	4.46	ESP	RBLC KS-0018 and KS-0027; PSD permits
Johns-Manville ⁵	Richmond, IN	Gas furnace (Line 2)	0.25	0.90	ESP	RBLC IN-0084; PSD and Title V permits
		Gas furnace (Line 3)	0.25	0.90	ESP	RBLC IN-0084; PSD and Title V permits
		Electric furnace (Line 6)	0.45	0.90	Baghouse/fabric filter	PSD and Title V permits
Johns-Manville ⁶	Winder, GA	Electric furnaces 1 & 2 (Line 106)	0.50	3.25	Baghouse/fabric filter	PSD and Title V permits
Guardian Glass, Inc ⁷	Inwood, WV	Electric furnace (Line 1)	0.061	0.23	Baghouse/fabric filter	RBLC WV-0017; PSD and Title V permits
		Electric furnace (Line 2)	0.063	0.25	Baghouse/fabric filter	RBLC WV-0017; PSD and Title V permits

⁵ The lb/ton limits were taken from the permit documents and the lb/hr limits were calculated based on the facility's maximum glass production capacities and lb/ton limits.

⁶ The lb/hr limit was taken from the permit documents and the lb/ton limit was calculated based on the facility's maximum glass production capacity and lb/hr limit.

⁷ The lb/ton limits were taken from the permit documents and the lb/hr limits were calculated based on the facility's maximum glass production capacities and lb/ton limits.

BACT for NOx - MANUFACTURING LINE

Step 1: Identify potentially available control technologies

The available NOx control alternatives for the manufacturing line include combustion controls, low-NOx burners, selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR). The forming and curing sections at the manufacturing line include natural gas-fired combustion processes. There are no combustion processes or other sources of NOx emissions at the cooling section. The cooling section only involves cooling the fiberglass mat using ambient air. Thus, a NOx BACT analysis will not include the cooling section. The NOx control alternatives are further described as follows.

Low-NOx Burners

Low-NOx burners (LNB) are special burners that are used minimize NOx emissions by lowering the peak flame temperature by pre-mixing combustion air with lean fuel mixture. A LNB provides a stable flame that has several different zones. For example, the first zone can be primary combustion. The second zone can be Fuel Reburning (FR) with fuel added to chemically reduce NOx. The third zone can be the final combustion in low excess air to limit the temperature. There are many variations on the LNB theme of reducing NOx. LNBs can have removal efficiencies of up to 80%. This can be one of the least expensive pollution prevention technologies with high removal efficiencies.

Selective Catalytic Reduction

SCR uses a catalyst to react with ammonia injected into the exhaust gas stream to chemically reduce NOx. The rate of the reduction reaction determines the amount of NOx removed from the flue gas. The major design and operational factors that affect the NOx removal performance of SCR include the reaction temperature range, uncontrolled NOx concentration level and ammonia slip.

The NOx reduction reaction is effective only within a given temperature range. The use of a catalyst in the SCR process lowers the temperature range required to maximize the NOx reduction reaction. The optimum range depends on the type of catalyst used and the flue gas composition. Optimum temperatures vary from 480°F to 800°F. At temperatures below the specified range, the reaction kinetics decrease and unreacted ammonia is released through the stack (i.e., ammonia slip). At temperatures above the specified range, nitrous oxide (N₂O) forms and catalyst sintering and deactivation occurs.

Typical SCR systems can tolerate temperature fluctuations of $\pm 200^{\circ}\text{F}$. The rate of the NOx removal normally increases with temperature up to a maximum between 700°F and 750°F . As the temperature increases above 750°F , the reaction rate and resulting NOx removal efficiency begin to decrease.

The uncontrolled NOx concentration also affects the reaction rate of the NOx reduction process. In general, higher uncontrolled NOx inlet concentrations result in higher NOx removal efficiencies due to reaction kinetics. However, NOx levels higher than approximately 150 ppm, generally do not result in increased performance. Low NOx inlet levels result in decreased NOx removal efficiencies because the reaction rates are slower, particularly in the last layer of catalyst. In general, though, SCR performs better than SNCR on sources with low uncontrolled NOx levels such as natural gas-fired boilers. SCR is generally more cost effective for sources that emit less NOx, since the required catalyst volume is minimal.

The last major design issue is the need to minimize ammonia in the flue gas stream (i.e., ammonia slip). Ammonia slip refers to the excess reagent passing through the reactor. Ammonia in the flue gas causes a number of problems, including health effects, visibility of the stack effluent, and the formation of ammonium sulfates. Ammonia slip does not remain constant as the SCR system operates but increases as the catalyst activity decreases. Properly designed SCR systems, which operate close to the theoretical stoichiometry and supply adequate catalyst volume, maintain low ammonia slip levels, approximately 2.0 to 5.0 ppm.

Other major design and operational factors include residence time available in the optimum temperature range, degree of mixing between the injected reagent and the combustion gases, and molar ratio of injected reagent to uncontrolled NOx. SCR is capable of NOx reduction efficiencies in the range of 70 to 90%.

Selective Non-Catalytic Reduction

SNCR involves the injection of urea or ammonia into an exhaust gas stream where the NOx reduction reaction occurs at temperatures between 1600°F and 2100°F . This technology is based on temperature ionizing the ammonia or urea instead of using a catalyst or non-thermal plasma. The temperature “window,” which is reported differently by various authors, is important because outside of it either more ammonia “slips” through or more NOx is generated than is being chemically reduced. Proprietary chemicals, referred to as enhancers or additives can be added to the reagent to lower the temperature range at which the NOx reduction reactions occur. The NOx concentration in the gas stream also affects the NOx reduction process. At lower NOx inlet concentrations, the optimum temperature for the reaction is lower, hence, the percent NOx reduction is lower. As an add-on control device, NOx reduction levels from an SNCR range from 30 to 50%.

Certain applications are more suited for SNCR due to the combustion unit design. Units with furnace exit temperatures of 1550°F to 1950°F, residence times of greater than one second, and high levels of NO_x are good candidates. There are hundreds of commercially installed SNCR systems on a wide range of boiler configurations. Other applications include thermal incinerators, municipal and hazardous waste combustion units, cement kilns, process heaters, and glass furnaces.

SNCR can be used on waste gas streams with high levels of particulate matter and can be applied with combustion controls to provide higher NO_x reductions. Aside from the temperature range requirement for operating the control system, SNCR is not applicable to sources with low NO_x concentrations such as gas turbines, and results in ammonia slip in the waste gas stream.

Step 2: Eliminate technically-infeasible options

Table 6 shows the BACT determinations from the RBLC and from other PSD and NSR permits for manufacturing line operations at similar facilities. The table shows that LNBs are used to control NO_x emissions from the curing ovens at Johns-Manville in Winder, Georgia and at the Knauf facility in Shasta Lake, California. LNBs are not known to be used in the forming sections at fiberglass plants. The forming section burners are usually direct flame impingement burners. Flame impingement compromises these NO_x reduction mechanisms. Therefore, LNBs are technically feasible for use in the curing oven but not in the forming section of the manufacturing line.

None of the permits reviewed for similar sources, or the entries in the RBLC identified SCR or SNCR as control options. SCR and SNCR have not been installed and operated on the manufacturing lines at any similar sources. Therefore, these technologies are not yet demonstrated. As stated above, two key concepts for determining whether an undemonstrated technology is feasible are “availability” and “applicability.” A technology is considered “available” if it can be obtained by the PSD applicant through commercial channels or is otherwise available within the common sense meaning of the term. An available technology is “applicable” if it can reasonably be installed and operated on the source type under consideration. A technology that is available and applicable is technically feasible.

Table 6: NOx Determinations for Manufacturing Lines at Fiberglass Facilities

Source	Location	Unit	Limit (lb/ton)	Limit (lb/hr)	NOx Controls	VOC Controls	Source of Information
Knauf Insulation ⁸	Lannett, AL	Line 621 curing oven	2.22	12.00	Unknown	RTO/Incinerator	PSD and Title V permits
		Line 622 curing oven A	1.31	12.00	Unknown	RTO/Incinerator	PSD and Title V permits
		Line 622 curing oven B	1.31	12.00	Unknown	RTO/Incinerator	PSD and Title V permits
Certainteed Corporation	Kansas City, KS	K-21 manufacturing line	1.00	12.40	Good combustion controls	Proprietary process modifications (no RTO/incinerator)	RBLC KS-0018; PSD permit
Johns-Manville ⁹	Richmond, IN	Line 6 forming, curing, and cooling	1.64	3.27	Unknown	Low-VOC product mix	PSD and Title V permits (NOx limits are non-BACT)
Johns-Manville ¹⁰	Winder, GA	Line 106 forming, curing, and cooling	6.05	38.10	LNBS at curing oven	RTO/Incinerator	PSD and Title V permits
Guardian Glass, Inc. ¹¹	Inwood, WV	Line 1 forming/collection, curing, and cooling	4.07	15.26	Combustion controls	RTO/Incinerator	RBLC WV-0017; PSD and Title V permits
		Line 2 forming/collection, curing, and cooling	4.07	16.28	Combustion controls	RTO/Incinerator	RBLC WV-0017; PSD and Title V permits
Owens Corning	Cordele, GA	CG104 forming and CG105 curing sections	3.00	--	Combustion controls	Fume Incinerator	RBLC GA-0125; PSD permit

⁸ The NOx limits apply to the curing ovens only and not the forming or cooling sections of the manufacturing lines. The lb/hr limits were taken from the permit documents and the lb/ton limits were calculated based on the facility's maximum glass production capacities for each line and the lb/hr limits.

⁹ The lb/hr limit was taken from the permit documents and the lb/ton limit was calculated based on the facility's maximum glass production capacity and lb/hr limit.

¹⁰ The lb/hr limit was taken from the permit documents and the lb/ton limit was calculated based on the facility's maximum glass production capacity and lb/hr limit.

¹¹ The lb/ton limits were taken from the permit documents and the lb/hr limits were calculated based on the facility's maximum glass production capacity and lb/ton limits.

Both SCR and SNCR are commercially available. Commercial availability by itself, however, is not necessarily sufficient basis for concluding a technology to be applicable and therefore technically feasible. We must further determine whether the control alternatives, SCR and SNCR, are applicable to the source type under consideration. In general, a commercially available control option will be presumed applicable if it has been or is soon to be deployed (e.g., specified in a permit) on the same or similar source.

SCR has been used in a variety of industries and there appears to be no specific technological barrier to its application to fiberglass facilities. In fact, the Texas Commission on Environmental Quality issued a permit in 2004 to a glass fiber manufacturing facility called Quietflex Manufacturing, which is similar to Knauf's Shasta Lake, California facility. Quietflex is permitted for two manufacturing lines that will utilize thermal oxidizers to control VOCs. These oxidizers greatly increase the potential for NO_x emissions. To meet its NO_x limit, the permit requires the facility to install SCR or an equivalent control device if necessary to reduce NO_x from one of its manufacturing lines. Based on the widespread use of SCR, including its proposed use at a similar facility, we conclude that SCR is an applicable technology and should be considered technically feasible.

In order for SNCR to be feasible for reducing NO_x at the manufacturing line, the control technology has to operate at the optimum temperature range of 1600°F to 2100°F with elevated inlet NO_x concentrations at least greater than 100 parts per million by volume (ppmv). There are a number of places in the manufacturing line where controls may be "inserted" but the exhaust stream characteristics at each of these points preclude the use of SNCR. The four potential locations for "inserting" NO_x controls are following the forming section, following the curing oven, following the thermal oxidizer and at the Main Stack. The NO_x emissions of concern are created by the thermal oxidizer, so controls following the forming section and the curing oven will offer little benefit where NO_x emissions do not exceed 2.2 ppmv. These concentrations are well below the concentrations needed for feasible operation of SNCR. Moreover, exhaust gas temperatures at these points do not exceed 500°F, which is well below the range required for SNCR. Even after the thermal oxidizer, NO_x concentrations from the Main Stack do not exceed 7.0 ppmv, which is still too low for SNCR to be considered a feasible control option.

Step 3: Rank existing control technologies

The remaining control technologies are LNBs for the curing oven and SCR. Since the curing oven already uses LNBs, the baseline NO_x emissions from this operation will be based on the use of LNBs.

There is no NOx standard under 40 CFR parts 60 or 61 that apply to the manufacturing lines at fiberglass manufacturing facilities. Table 6 shows the NOx determinations from the RBLC and other PSD or NSR permits for similar facilities. For the purpose of comparison, we look at facilities that have a similar control strategy as Knauf. Knauf uses a thermal oxidizer to control VOC emissions and LNBs to control NOx from the curing oven in its manufacturing line.

Table 6 shows that Knauf Insulation in Alabama, Johns-Manville in Georgia, and Guardian Glass in West Virginia have similar operations. The Johns-Manville plant uses LNBs in its curing oven to control NOx. The Knauf plant in Alabama has the lowest NOx rates, but since these rates only apply to the curing ovens they cannot be used since the NOx performance level does not represent the entire manufacturing lines at the Alabama plant. Thus, of the Johns-Manville and Guardian Glass plants, the lowest NOx performance rate is 4.07 lb/ton achieved at the Guardian Glass facility.

In its PSD application, Knauf proposed NOx emissions rate of 2.78 lb/ton and 22.6 lb/hr for the manufacturing line. The most recent Permit to Operate, issued by the District, limits NOx from the manufacturing line to 2.04 lb/ton and 16.5 lb/hr based on a glass production capacity of 195 tons per day. At 225 tons per day, the NOx limits would be 1.76 lb/ton and 16.5 lb/hr. Since this shows that the manufacturing line can achieve a lower NOx emissions performance level while using LNBs at the curing oven, the lower NOx rates of 1.76 lb/ton and 16.5 lb/hr will be used as the baseline rates in this BACT analysis. This currently represents the lowest emissions level for a manufacturing line at a wool fiberglass facility using LNBs in the curing oven.

SCR can be placed at various places within the manufacturing line. This BACT analysis will explore the NOx emissions performance levels, costs, and other impacts associated with installing SCR following the forming section, following the curing section, and at the combined stack (Main Stack) of the manufacturing line. Table 7 shows the emission levels that could be achieved using LNB (i.e., baseline) and SCR at the three points in the process listed above.

The assumptions used in this BACT analysis are based on a glass production capacity of 225 tons per 24-hour production day, plant operation of 8760 hours per year, a control efficiency of 85% for SCR, and baseline NOx rates of 1.76 lb/ton and 16.5 lb/hr at the manufacturing line.

Table 7: NO_x BACT Control Hierarchy

Control Option	Range of Control (%)	BACT Analysis Control Level (%)	Manufacturing Line Emission Rate (lb/ton)	Manufacturing Line Emission Rate (tpy)
SCR at the Main Stack	70-90	85	0.47	19.4
SCR at the Curing Section	70-90	85	0.53	21.6
SCR at the Forming Section	70-90	85	1.70	69.9
LNBs	Baseline	Baseline	1.76	72.3

Step 4: Evaluate the most effective controls

In our evaluation of the most effective controls, economic, environmental, and energy impact analyses are considered. The economic impact analysis is used to quantify the cost of control. Usually, if the cost of reducing emissions, as expressed in dollars per ton of pollutant removed (\$/ton), is on the same order as the cost previously borne by other sources of the same type in applying the control alternative, then the control alternative is considered economically feasible, and therefore acceptable as BACT.

No BACT determinations have been made in which SCR control was required to control NO_x at the manufacturing lines at other wool fiberglass facilities. A recent permit decision required SCR to be installed at the manufacturing line at Quietflex Manufacturing, which is a similar fiberglass facility in Texas. This control measure was, however, adopted for the purpose of avoiding NSR, so no cost analysis was completed.

EPA prepared its own cost analysis to correct a number of problems in Knauf's economic analysis that overstated the costs and cost effectiveness for each of the control alternatives. For example, Knauf's estimates included the use of actual emissions rather than allowable emissions, an interest rate of 10% instead of 7% to calculate the capital recovery factor as recommended in EPA's Cost Manual, and higher operation and maintenance costs in comparison to the costs recommended in the EPA Cost Manual. Knauf also used actual operating hours instead of year-round operation at 8760 hours per year, which would be required since the facility did not request a limit on operating hours. Knauf's economic analysis concluded the cost effectiveness for installing SCR at any point on the manufacturing line would be greater than \$15,000 per ton of NO_x removed.

Even after correcting these problems, SCR does not appear to be cost effective, for the Knauf facility. Using allowable emissions of 1.76 lb/ton and 16.5 lb/hr, year-round operation at 8760 hours per year and other recommendations from the Cost Manual, Table 8 shows the likely cost estimates for installing SCR at various places on the

manufacturing line. Based on this information, the cost effectiveness for each control alternative appears excessive, especially for installing SCR following the forming section and at the Main Stack.

Table 8: Economic Impact Analysis

Process	Emissions Reductions (tpy)	Total Capital Costs (\$)	Total Annualized Cost (\$/yr)	Average Cost Effectiveness (\$/ton)
SCR at Main Stack (Manufacturing Line)	52.9	4,820,016	7,763,949	146,798
SCR at Curing Section	50.7	1,790,020	711,985	14,034
SCR at Forming Section	2.4	4,457,620	7,990,497	3,347,366
LNBs without additional controls	Baseline	Baseline	Baseline	Baseline

The results of Knauf's environmental and energy impact analyses are listed in Table 9. The environmental impacts analysis considers impacts other than impacts on air quality standards due to emissions of the regulated pollutant in question, such as solid or hazardous waste generation, discharges of polluted water from a control device, visibility impacts, or emissions of unregulated pollutants. The energy impacts analysis examines the energy requirements of the control alternatives to determine whether the use of the technology results in any significant or unusual energy penalties or benefits. The results of the economic, environmental, and energy impacts analyses are as follows.

Table 9: Environmental and Energy Impacts

Process	Environmental Impacts? (Yes/No) ¹²	Energy Impacts (Increase over baseline in MMBtu/hr)
SCR at Main Stack (Manufacturing Line)	Yes	163
SCR at Curing Section	Yes	None
SCR at Forming Section	Yes	160
LNBs without additional controls	No	Baseline

¹² Catalyst replacement for SCR control creates solid waste that must be disposed.

The temperature of the exhaust at the Main Stack is 138°F. In order for SCR to be effective, the exhaust gas would have to be heated to be within the optimum temperature range of 480°F to 800°F using natural gas. In Knauf's analysis, 575°F is used. Knauf estimated that the natural gas combustion required to heat the exhaust to 575°F would be a nominal 163 million Btu per hour, which would cause additional NO_x emissions of 13.0 lb/hr. Table 8 shows that the average cost effectiveness would be \$146,798 per ton of NO_x removed, which exceeds what we would generally consider cost effective. Therefore, the most stringent control alternative is eliminated mainly due to its cost infeasibility, but also due to the additional energy penalty associated with the use of SCR.

For SCR to be operated at the curing section, the control device would have to be placed beyond the junction of the thermal oxidizer and cooling line exhaust streams. The combined exhaust for the curing oven and cooling section would be approximately 800°F. Exhaust gas temperatures therefore would be within the range for use of SCR without significant energy impacts. There would, however, be a high potential for catalyst plugging from the binder. The SCR unit would have to undergo very frequent catalyst cleaning. Table 8 shows that the average cost effectiveness would be \$14,034 per ton of NO_x removed, which exceeds what we would generally consider cost effective. Therefore, this control alternative is eliminated due to its cost.

Finally, the installation of SCR following the forming section suffers from the same temperature problem as installation at the Main Stack. The exhaust temperature at the forming section is 101°F. In order for SCR to be effective at the forming section, the exhaust gas would have to be heated to be within the optimum temperature range of 480°F to 800°F using natural gas. In Knauf's analysis, 575°F is used. Knauf estimated that the natural gas combustion required to heat the exhaust to 575°F would be a nominal 160 million Btu per hour, which would result in additional NO_x emissions of 12.8 lb/hr. Table 8 shows that the average cost effectiveness would be \$3,347,366 per ton of NO_x removed, which exceeds what we would generally consider cost effective. Therefore, the control alternative is eliminated due to its cost infeasibility.

Step 5: Select BACT

For the reasons described above, SCR is not BACT for this facility. We conclude that LNBs represent BACT and can achieve NO_x emissions of 1.76 lb/ton of glass pulled and 16.5 lb/hr.

VIII. TESTING & COMPLIANCE REQUIREMENTS

The PSD permit requires Knauf to conduct stack or performance tests annually for PM10 at the Furnace Stack and NOx and PM10 at the Main Stack. For the Furnace Stack, Knauf is required to conduct a performance test in accordance with CARB Methods 1 through 5. The CARB test methods are applicable for determining total suspended particulate (TSP) which is used as a surrogate for determining PM10 emissions. CARB Methods 1 through 5 are equivalent to EPA's test methods for TSP and are already required by Knauf's PSD permit to show compliance with its PM10 limit for the Furnace Stack. For the Main Stack, the permit requires EPA Test Methods 1 through 4 and 7E for NOx and EPA Test Method 5E is required for PM10 (as TSP).

Knauf is required to determine compliance with the lb/ton BACT limits for NOx and PM10 that apply to the Furnace Stack and Main Stack by using the results of the performance tests and the hourly glass production rate during the performance tests. Knauf is also required to calculate hourly emissions of NOx and PM10 (as TSP) from the Furnace Stack and Main Stack to show compliance with the lb/hr emission limits in the permit since Knauf does not have continuous monitoring. The permit requires Knauf to calculate hourly emissions by multiplying the lb/ton actual emission factors for NOx and PM10 (as TSP) determined after each performance test by the actual hourly glass production rate. The permit requires Knauf to continuously monitor the actual glass production rate on an hourly basis.

IX. RECORDKEEPING & REPORTING REQUIREMENTS

The permit requires Knauf to keep all records of all measurements for a period of five (5) years. Records must be kept for the daily glass production rate, hourly production rate, performance tests, calculations of the actual lb/ton emission factors for NOx and PM10 (as TSP), and calculations of actual hourly emissions for NOx and PM10.

Knauf is also required to submit excess emissions reports to EPA for the NOx and PM10 emission limits for the Furnace and Main Stack, on a semiannual basis. Knauf must also submit a written report of the following actions on a semiannual basis for each baghouse and dust collector leak detection system: (a) each occurrence of the alarm for the bag leak detection system, (b) the corrective action(s) taken for each occurrence of the alarm, and (c) the duration for completing each corrective action(s).

X. AMBIENT AIR QUALITY ANALYSIS

An applicant for a PSD permit is required to conduct an air quality analysis of the ambient impacts associated with the construction and operation of the proposed new source or modification. An analysis is required for each regulated pollutant, which includes criteria and noncriteria pollutants that will be increased in a significant amount. The main purpose of the air quality analysis is to demonstrate that new emissions from a proposed major stationary source or major modification, in conjunction with other

applicable emissions increases and decreases from existing sources (including secondary emissions from growth associated with the new project) will not cause or contribute to a violation of any applicable National Ambient Air Quality Standards (NAAQS) or PSD increment. Ambient impacts of noncriteria pollutants must also be evaluated.

An air quality analysis is required for NOx. Knauf conducted a PM10 air quality analysis previously for the PSD permit it obtained from the District. The air quality analysis modeled at a level of 191.8 tpy for PM10 which is higher than the facility's current permitted PTE of 124.4 tpy.¹³ This air quality analysis was found not to cause or contribute to a violation of the NAAQS and PSD increments for PM10.¹⁴

The air quality impact analysis generally involves an assessment of existing air quality and predictions of ambient concentrations that will result from the project and future growth associated with the project. This usually involves the use of dispersion modeling and ambient monitoring data. The dispersion modeling analysis involves two distinct phases: (1) a preliminary analysis and (2) a full impact analysis. The preliminary analysis consists of modeling only the significant increase in potential emissions of a pollutant from a proposed new source, or the significant net emissions increase of a pollutant from a proposed modification.

The results of the preliminary analysis are used to determine whether a full impact analysis is required, which involves estimating the background pollutant concentrations resulting from existing sources and growth associated with the project subject to PSD. In addition, the preliminary analysis determines whether further air quality analyses are required for a pollutant and whether ambient monitoring data requirements should be completed. Ambient monitoring data requirements include pre-construction monitoring, post-construction monitoring, and meteorological monitoring. Thus, a full impact analysis is not required for a particular pollutant when emissions of that pollutant would not increase ambient concentrations by more than prescribed significant ambient impact levels.

¹³ The District PTOs issued to Knauf limits the facility's PM10 PTE to 78.8 tpy, which is much lower than the PSD permit limits.

¹⁴ Even if modeling had considered the existing permitted levels, a 2.5 tpy increase in the PTE for PM10, as allowed by this permit revision, would not show up as a change in the modeling results.

Dispersion Model Selection and Inputs

Dispersion models estimate the ambient concentrations that will result from a PSD applicant's proposed emission increases in combination with emissions from existing sources. The estimated total concentrations are used to demonstrate compliance with any applicable NAAQS or PSD increments. Impacts on ambient air quality from Knauf were assessed using the Industrial Sources Complex Plume Rise Model Enhancements (ISC PRIME) air dispersion model. This model includes COMPLEX I modeling capability for complex terrain and the PRIME algorithm for aerodynamic downwash determination. The ISC PRIME model also evaluates the impacts of multiple sources and sources over distances up to 50 km. A modeling analysis was performed at annual intervals for NO_x.

Source Data - Emission rates and other source-related data are needed to estimate the ambient concentrations resulting from the NO_x increase at Knauf and existing sources contributing to background pollutant concentrations. Source data used in the ambient impact analysis are listed in Table 10.

Table 10: Stack Exit Parameters for Manufacturing Line

Parameter	Value
Stack height	199.0 ft
Exit temperature	137.7°F
Exit diameter	17.0 ft
Flowrate	403,828 ACFM
Exit velocity	29.7 ft/s
NO _x emission rate	22.6 lb/hr (99 tpy) ¹⁵
Load	100%

Good Engineering Practice (GEP) Stack Height - The GEP stack height is defined under section 123 of the Clean Air Act as the height necessary to insure that emissions from the stack do not result in excessive concentrations of any pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies or wakes which may be created by the source itself, nearby structures or nearby terrain obstacles. The stack must not exceed what is considered to be the GEP stack height for the source. The portion of a stack height that is in excess of the GEP height is generally not creditable when modeling to develop source limitations or to determine source impacts in the air quality analysis. For a stack height less than GEP height, screening procedures should be applied to assess potential air quality impacts associated with building downwash.

¹⁵ This is a conservative estimate based on the NO_x emission level requested by Knauf in its 2003 PSD application. The new proposed BACT limit will be 16.5 lb/hr (72.3 tpy), which is much lower. Therefore, ambient impacts are expected to be much lower than the estimates predicted in the modeling analysis.

The dimensions of the Knauf buildings, with a minimum building height of 78 feet, plus a batch house height of 125 feet, Knauf determined that the GEP stack height to avoid downwash effects in all directions was 310.2 feet. Knauf used a stack height of 199 feet, to minimize the visual impact of the facility, in the modeling analysis. Since this height is less than the GEP stack height, the model used was run with the option to evaluate the effects of aerodynamic downwash.

Land Use - Land use within 3 km of the Knauf site was evaluated using the Auer classification procedure. The procedure resulted in a rural determination since 70% of the area surrounding the facility was classified as rural. Thus, rural dispersion coefficients were used in the modeling analysis.

Meteorological Data - Meteorological data for the modeling was based on five years of hourly surface data from the Redding airport, from 1987 to 1991. Concurrent upper air mixing height data were obtained from the nearest available source in Medford, Oregon. Data from Redding, California and Medford were used because, when compared with other meteorological stations providing data in compatible formats, they provide the most representative meteorological data for the Knauf facility location.

Terrain Data - The terrain surrounding the Knauf site is complex, which is characterized by terrain features above the effective stack height of the stack. For modeling complex terrain, Knauf used USGS digitized terrain in 30-meter increments out to 48 kilometers in each direction of the facility.

Receptor Network - The Knauf facility was modeled out to 2.6 km in each direction with a 100-meter rectangular grid (cartesian network), to 10 km in each direction with a 500-meter grid, and 45 km in each direction with a 5000-meter grid.

Modeling Analysis

The modeling results shown in Table 11 show the predicted NOx impacts are below the PSD increment of 25 $\mu\text{g}/\text{m}^3$ and significant ambient impact level of 1 $\mu\text{g}/\text{m}^3$, and will not cause or contribute to a violation of the PSD increment.

Table 11: Class II Impacts Analysis

Pollutant	Averaging Period	Maximum concentration ($\mu\text{g}/\text{m}^3$)	Class II Increment ($\mu\text{g}/\text{m}^3$)	Class II Significance Level ($\mu\text{g}/\text{m}^3$)
NOx	Annual	0.45	25	1

Also, Table 12 shows the results of ambient air quality impact from the facility. The results show that the maximum NOx impacts from Knauf, when combined with the background ambient air quality, will not cause or contribute to a violation of the NAAQS. Based on the results in Tables 11 and 12, no significant concentrations of NOx are predicted to occur. Therefore, further air quality analyses are not necessary.

Table 12: NAAQS Impacts Analysis

Pollutant	Averaging Period	Modelled Maximum for Knauf ($\mu\text{g}/\text{m}^3$)	Maximum Background Ambient Air Quality ($\mu\text{g}/\text{m}^3$) ^{16,17}	Combined Total Impact ($\mu\text{g}/\text{m}^3$)	NAAQS for NO ₂ ($\mu\text{g}/\text{m}^3$)
NOx	Annual	0.45	16.5	17	100

¹⁶ Knauf used NOx ambient air quality data from a Bella Vista, California Ozone Study performed by the California Air Resources Board in 2000.

¹⁷ The annual NOx background concentration that was used in Knauf's modeling analysis is based on 60-day sampling period.

XI. CLASS I IMPACT ANALYSIS

The PSD regulations require an analysis of the impact the emission increases in NO_x and PM₁₀ from Knauf would have on nearby, usually within 100 km, Class I areas. Class I areas are areas of special national or regional natural, scenic, recreational, or historic value for which the PSD regulations provide special protection. The Class I analysis is used to determine whether the emission increases will cause or contribute to a violation of the Class I increments and whether it will have an adverse impact on the air quality related values (AQRV) of a particular Class I area. The AQRVs are those special attributes of a Class I area that may be adversely affected by deterioration of air quality.

Knauf submitted a Class I analysis dated June 27, 2003. Knauf is located near several Class I areas. The facility is located within 100 km of the Thousand Lakes Wilderness, Yolla Bolly Middle Eel National Wilderness, Lassen Volcanic National Park and Caribou Wilderness. The facility is located within 200 km of the Marble Mountain Wilderness, Lava Beds National Monument, Redwood National Park, Mountain Lakes Wilderness and South Warner Wilderness.

Air dispersion modeling was performed using CALPUFF, released on May 6, 2003, to model for PM₁₀ and NO_x concentrations, nitrogen deposition and visibility. The model inputs are the same inputs used in the dispersion modeling for the air quality analysis.

CALPUFF Screening Model

An alternative screening procedure was used to provide a conservative estimate of AQRV impacts from Knauf on each Class I area. The screening methodology consisted of the following: (1) generate and model five years of ISCST3 meteorological data for each Class I area; (2) create a ring of receptors spaced every two degrees, with the radius being equal to the distance from Knauf to each respective Class I area; (3) use CALPUFF input parameters to reflect standard ISC defaults; (4) select the MESOPUFF II chemistry option; (5) set ozone and ammonia background concentrations conservatively to 80 and 10 ppb, respectively; (6) use background concentrations to reflect natural conditions of each Class I area; and (7) set monthly relative humidity values equal to the maximum seasonal value for each Class I area.

Source Data - The stack parameters used in the modeling analysis are listed in Table 13.

Table 13: Stack Parameters

Parameter	Main Stack	Furnace Stack
UTM Coordinates (NAD 27, Zone 10)	Northing: 4500.724 Easting: 551.570	Northing: 4500.633 Easting: 551.581
Base Elevation	225 meters	224 meters
Stack height	60.7 meters	25.9 meters
Exit temperature	331.9 K	319.4 K
Exit velocity	9.04 m/s	16.7 m/s
Stack diameter	5.18 meters	0.94 meters
PM10 emission rate	27.4 lb/hr	1.0 lb/hr
NOx emission rate	--	22.6 lb/hr ¹⁸

Meteorological Data - Meteorological data for modeling was based on five years of hourly surface data from the Redding Municipal Airport (1987-1991). Concurrent upper air mixing height data was obtained from the nearest available source in Medford, Oregon. Data from Redding and Medford were used in this analysis because they provided the most representative meteorological data for the Knauf facility. The data were pre-processed for the CALPUFF dispersion model, and were used for computing visibility, concentration, and dry deposition impacts.

Receptor Network - A polar receptor ring was created for each Class I area with receptors positioned every two degrees (180 degrees total). The distance from the source to the receptor ring is equal to the distance to each Class I area. The elevation of each receptor is set to be an elevation representative of each respective Class I area. Receptor ring distances and elevations are provided in Table 14.

¹⁸ This is a conservative estimate based on the NOx emission level requested by Knauf in its 2003 PSD application. The new proposed BACT limit will be 16.5 lb/hr (72.3 tpy), which is much lower. Therefore, ambient impacts are expected to be much lower than the estimates predicted in the modeling analysis.

Table 14: Receptor Ring Placement for each Class I Area

Class I Area	Receptor Ring Distance from Knauf (km)	Receptor Elevation (m)
Thousand Lakes Wilderness	62.8	1615
Yolla Bolly Middle Eel National Wilderness	69.2	549
Lassen Volcanic National Park	69.9	1768
Caribou Wilderness	95.1	2073
Marble Mountain Wilderness	100.8	1707
Lava Beds National Monument	132.4	1722
Redwood National Park	138.1	366
Mountain Lakes Wilderness	179.3	2134
South Warner Wilderness	189.6	1890

CALPUFF Modeling Analysis

A modeling analysis was performed to determine the impacts at each Class I area. Visibility, concentration, and deposition impacts were analyzed and compared to threshold values. Table 15 shows the threshold values used to determine whether additional analyses were necessary to assess Knauf's impact on a Class I area.

Table 15: Threshold Values used in Class I analysis

Modeled Impact	Parameter	Averaging period	Threshold Value
Visibility	Extinction Change	24-hour	5
		Annual	1
	Delta Deciview	24-hour	1
		Annual	0.1
Class I Increment	PM10	24-hour	8 $\mu\text{g}/\text{m}^3$
		Annual	4 $\mu\text{g}/\text{m}^3$
	NOx	Annual	2.5 $\mu\text{g}/\text{m}^3$
Significance Level ¹⁹	PM10	24-hour	0.32 $\mu\text{g}/\text{m}^3$
		Annual	0.16 $\mu\text{g}/\text{m}^3$
	NOx	Annual	0.10 $\mu\text{g}/\text{m}^3$
Nitrogen Deposition	Threshold value	--	0.005 kg/ha-yr

The highest or most conservative results were obtained using the Redding surface data. The results showed that visibility and concentration impacts for NOx and PM10 were less than all the threshold values listed in Table 15 for all Class I areas. The results also showed that nitrogen deposition impacts due to NOx were less than the threshold values listed in Table 15 for all Class I areas, except for Thousand Lakes Wilderness. The predicted NOx deposition at Thousand Lakes Wilderness was 0.00559 kg/ha-yr, which exceeded the threshold of 0.005 kg/ha-yr. However, EPA does not expect that the facility will significantly contribute to nitrogen deposition in the Class I area since the NOx emission rate used in the model was 22.6 lb/hr and the facility will be permitted at 16.5 lb/hr.

EPA has notified the applicable Federal Land Managers (FLMs) of Knauf's PSD permit application. The agency has not received a formal finding of a potential adverse impact from the FLMs. EPA does not expect the BACT NOx emissions rate will significantly impact the AQRVs in the Class I areas located within 200 km of the Knauf facility.

¹⁹ For purposes of determining whether additional impacts analysis is necessary, a modeling significance threshold equal to 4% of the Class I increment is used.

XII. ADDITIONAL IMPACTS ANALYSIS

The PSD regulations require PSD applicants to provide an analysis of the impairment to visibility, soils and vegetation that would occur as a result of the source and general commercial, residential, industrial and other growth associated with a new major source or major modification. Since the proposed permit revisions do not involve construction of new equipment and the facility uses only natural gas, the NO_x emissions and minor increases in PM₁₀ emissions from the facility are not expected to impair visibility, soils and vegetation in the surrounding area. No commercial, residential, and other growth are expected as a result of the NO_x and PM₁₀ pollutant increases. Therefore, no impairment to visibility, soils, and vegetation would occur due to these factors.

XIII. ENDANGERED SPECIES ANALYSIS

Pursuant to Section 7 of the Endangered Species Act (ESA), EPA is required to initiate consultation with the United States Fish and Wildlife Service (FWS) if any action, including permit issuance, might jeopardize the continued existence of endangered or threatened species or adversely modify their critical habitat.

Knauf was constructed in 2001 and began operation in 2002. As part of the application process before beginning construction of the new facility, Knauf completed an Environmental Impact Report (EIR) for Shasta County, dated July 1997, which included an analysis on the impact of the new facility on biological resources. The analysis examines several wildlife and plant species that are listed, proposed for listing, and candidates for listing as threatened or endangered plant and animal wildlife under the federal ESA occurring and potentially occurring at the site of the facility.

The permit revisions being analyzed here do not involve the installation of new pollution-emitting equipment, the construction of a new pollution-emitting facility plant, or the disturbance of any surrounding areas. Thus, the revised permit should not affect the ESA analysis and conclusion supporting the original PSD permit. Although the project will increase the facility's permitted NO_x and slightly increase potential PM₁₀ emissions, EPA's analysis has concluded that at the new level of emissions the national ambient air quality standards will not be exceeded. The permit revisions will not adversely affect biological resources and no measures for avoidance, minimization or mitigation of such effects are necessary.

In a letter dated March 10, 2004, the FWS has concurred with EPA's conclusion that the proposed permit revisions increasing the facility's air pollution levels of NO_x will not affect any proposed, listed threatened or endangered species or proposed or designated critical habitat for such species. The slight potential increase of 2.5 tpy in PM₁₀ emissions is also expected to have no effect on any endangered species. Therefore, based on its review of this project, EPA has concluded that this project will have no effect on listed species or their critical habitat, and thus, EPA's responsibilities under ESA Section 7 have been fulfilled.

XIV. CONCLUSION & PROPOSED ACTION

Based on the information supplied by Knauf and the analyses conducted by EPA, it is the preliminary determination of EPA that the proposed modification will not interfere with the attainment or maintenance of any applicable PSD increment or NAAQS, and meets all of the requirements of 40 CFR § 52.21. Therefore, EPA proposes to issue the PSD permit after soliciting public comment and conducting a public hearing.